Pak. j. life soc. Sci. (2025), 23(1): 4803-4815 E-ISSN: 2221-7630;P-ISSN: 1727-4915

Pakistan Journal of Life and Social Sciences
www.pjlss.edu.pk

https://doi.org/10.57239/PJLSS-2025-23.1.00380

RESEARCH ARTICLE

Interpretations in the Museum for Visual Impairment Learning Enhancement: Case Study of the Coin Museum, Thailand

Dr. Ratchaneekorn Sae-Wang[1*], Dr. Phitchakan Chuangchai[2]

[1]Assistant Professor of Cultural Management, College of Innovation, Thammasat University, Bangkok, Thailand
[2] Lecturer, College of Innovation, Thammasat University, Bangkok, Thailand

ARTICLE INFO

Received: Dec 10, 2024

Accepted: Jan 18, 2025

Keywords

Coin Museum

Interpretations

Learning Enhancement

Visual Impairment

***Corresponding Author:**

ratchaneekorntu23sep15@gmail.com

ABSTRACT

Interpretations are one of the most significant elements in museums enhancing visitors learning, including those who have visual impairment. The Coin Museum, as a well-known museum, is uniquely designed to provide interpretation and other facilities for visitors with visual impairment and other disabilities. This research aims to survey and assess interpretation for the blind in the Coin Museum with the employment of mixed methods. The quantitative method was conducted through questionnaire distributed to voluntary visually impaired students and teachers to assess the efficiency of interpretations. Focus group discussions with students and teachers and in-depth interviews with museum staff involved in the visual impairment were conducted to support the validity of the research. The study found that the quantity of interpretations in the Coin Museum was sufficient for visually impaired students and appropriate for basic sensory skill learning. Meanwhile, the efficiencies of both interpretations, person and non-person, were highly regarded, but improvement is needed. Special communicative skills and more practical universal design concepts should be improved in person and non-person interpretation. Consequently, interpretations in the Coin Museum reflect incomprehensive, centralized and impractical policy to enhance visual impairment learning in the wider perspective and it reinforces the image of visually impaired individuals as burdensome.

INTRODUCTION

Thailand modernization in the reign of King Rama V is the transition period from a traditional kingdom to a modern one with international engagement through reformations in various aspects: administration, law, military, economics policies, infrastructure and education including museum establishment (Kluaymai, 2005). The initial museum was founded during his reign in the Grand Palace and his personal collections. Textile, artistic, historical, and archaeological treasures, including royal regalia, are showcased to reflect the country's rich cultural heritage and a long-standing history. the existence of this museum is one of the remarkable steps to display modernity and civilization of Thailand to avoid the threat of western imperialism, and the ability to maintain its independence (Jongkol, 1989).

The museum has rooted in Thailand since then and gradually improved in terms of location, management, and awareness. The expansion and renovation were undertaken, and the collections were moved to the Front Palace for all Thai people to access supervised by the Royal Institute to monitor and collect archaeological artifacts through the kingdom in the museum as the source of national treasure. The National Museum, Bangkok, the largest museum in Thailand, was officially

established during the reign of King Rama VII (Yudee, 1970). This is the first official step of museum and certainly affects towards museum acknowledgement as a place of antique collections which has been inherently embedded in Thais' perception and impacted to their low interest. Consequently, the efforts to conceptualize museums' image and gain more interest to improve museum potential of both infrastructure-universal design and policy – education, modernity, variety, technology, long life learning and visitor interaction are key elements in presenting museums in relation to the National Education Act 2542 (B.E), Sector 25, accompanying with "*plearn* concept" (derived from play and learning backed up by Thai definition as learning with fun) or edutainment in learning centers or museums (Chinthammamitr, 2019; Lumidao et al., 2024). The significance of visual impairment and learning was initially mentioned in the education policy and was formally included in Constitution of the Kingdom of Thailand (B.E 2560). The supreme Thai law empowers the blind in at least three aspects: rights and equality (Section 4), comprehensive and easy access to public health services and infrastructures (Section 48, 48, 55, 5), and the twelve-year compulsory education with financial support and long-life learning promotion (Section 54).

This legal support for the blind's learning accord with UNESCO and subordinate organizations, playing a significant role in promoting inclusive education and cultural accessibility for people with disabilities, including the blind. In the context of enhancing learning opportunities for the blind within museums, UNESCO emphasizes the importance of creating inclusive environments and promoting cultural participation for all individuals (UNESCO, 2020; Jam et al., 2010).

This policy has been concretely implemented into schools, infrastructures, and designs for the blind, especially in exhibitions and museums as learning centers. However, compared to tools and learning centers at the international level, it was found that the blind learning enhancement in Thailand was minimal. The trace of contribution was monitored through events and temporary exhibitions by two main sectors, the private and the governmental organizations. The private sector mostly organized exhibitions to raise awareness about the blind and allow able-bodied people to experience the world from the blind's perspective. In The exhibition "the Dialogue in the Dark", the blind would guide visitors while walking in darkness and let them experience the daily life and environment from the blind's perspective. This reversal of role helped to enhance mutual understanding and human diversity (National Science Museum, 2021; Jam et al., 2013). Also, the exhibition titled "Insight" by Samsung featured photos taken by blind students who attended photography techniques workshop by a professional photographer in the "What does your mind see?" project. Their photos were auctioned to support next generation activity (Samsung, 2014). Not only did this exhibition display Samsung corporate social responsibility but it also helped to promote Samsung camera products.

Like the process undertaken by private organizations, limited budget and expertise prompted governmental organizations like Fine Art Department and National Museum Bangkok to ask for cooperation from the National Museum volunteers and the Thailand Association of the Blind for volunteer training to take care of blind people and non-permanent exhibitions, as well as enhancing tactile experience through replicas of ancient Thai sculptures in "Touching Thailand". Unfortunately, this project demonstrated a gradual decline before eventually closing (Moore, 2015). However, this model has inspired others related organizations and further projects, such as the Ministry of Social Development and Human Security which cooperated with the Ministry of Culture in providing a mobile exhibition unit for the blind to access. More than 30 replicas of Thai historical objects replica such as pottery, buddha and deity statues, were displayed to enhance the blind' tactile experiences fully supported by information written in braille. This exhibition was attended by blind stakeholders and underprivilege area children (Department Secretary Office, 2015).

Those mutual cooperations by both private and public sectors to enhance the blind learning's competency through temporary exhibitions are significant steps and has been gradually developed into the permanent one in museum. However, the initiative museum, Tactile Museum, Faculty of Medicine, Mahidol University has encountered numerous constraints such as limited space, medical content, and tactile experience (Siriraj Museum, 2019). Due to those constraints, the following museum has attempted to address the shortcomings by designing facilities and interpretation to

respond to the blind's basic requirements. The Coin Museum was then founded in 2015 by the Treasury Department in central Bangkok to educate Thai audience and foreigners concerning numismatic products from ancient times to the present. The Three-storey building displays learning tools, interactive multi-media, activities, and information boards based on safe mode and universal design. Certainly, this museum has been expected to be a museum for visual impairment to fulfill museum gap. Moreover, this museum policy is widely acknowledged not only as learning center for people with disabilities but also as a tourism destination in central Bangkok (Sakklavut, 2020).

Currently, it can be said that the Coin Museum is the representative of contemporary museums in Thailand with the attempt to eliminate disadvantages and improve relevant basic facilities, especially interpretation enhanced for visually impaired visitors. The Coin Museum, the only one museum that probably can respond to all requirements of people with disabilities the most due to the full function of the interpretative service based on universal design of built environment, facilities with technology adaptation, if compared to the previous ones. Also, this museum operation reflects the effort to compile contemporary museum concept regarding democracy policy, amusement, long life learning, and access for all, especially disabilities. Consequently, interpretations play major roles in enhancing visual impairment and learning in the museum. The assessment of category, quantity and quality of interpretations for visual impairment is required to prove whether the museum has provided complete interpretations to activate their sensory learning skills and efficiency of learning enhancement concerning comprehension, awareness and amusement as the goal of interpretation and museum policy or not. This research aimed to survey and assessed interpretations for visual impairment in the Coin Museum to display the categories of interpretation, sensory skill improvement, and efficiency of learning which can reflect the current situation and learning disruption of visual impairment.

LITERATURE REVIEWS

Principle of Interpretation

The principle of interpretation was firstly contributed by Freeman Tilden (1977), an American interpreter working for National Park Service with a significant role of interpretative development in natural and cultural heritage sites. The key concept of interpretation is effective communication to create meaningful experiences for audiences or visitors and his well-known principles include1) visitor's interest and experience for clear comprehension 2) good information 3) integration of multiple knowledge to intellectually and emotionally engage visitors 4) provocation of visitor's wisdom, emotion and sense of protection 5) a holistic experience, and 6) tailored interpretative programs for young visitors.

His idea was widely recognized and has been furthered study underlining communicative approaches and techniques to provide easy access to targeted audiences and financial management. Interpretation is consequently divided into two categories.)Seccombe & Lehnes, 2015)

A. Personal interpretation refers to an individual process of explanation towards audiences or visitors based on information and on knowledge with own experiences and social contexts like curators, guides, or informers. It offers flexibility, emotional and cultural influence, creative expression, two-way communication, and critical thinking provocation. On the contrary, subjectivity, cultural diversity, limited access, and personal communicative skills are the limitations of this category of interpretation.

B. Non-personal interpretation is a process of conveying information through medias which are typically divided into two types:

1. Traditional media, which refers to a one-way communication to evoke visitors' interaction such as textbooks, brochures, video, films, multi-media, AR (augmented reality), VR (virtual reality), 2D or 3D medias, and

2. New media, which is a two-way communication and immediate response linking to the internet such as social media, website and information on cyber space.

The strengths of non-personal interpretation are mass communication, and creative and vivid demonstration. However, costs of production and high maintenance are the main limitations. Typically, both interpretations share common goals as follows. (McArthur & Hall, 1996; Timothy & Boyd, 2003; Lertcharnrit, 2011)

- To educate and raise awareness for collective memory and experience based on responsibility and enjoyment.
- To generate economic benefits and promote tourism for longer stay and tourist attraction.
- To achieve tourist management goals and minimize impacts from over carrying capacity
- To communicate with both internal and external organizations for stakeholders' participation and mutual comprehension to improve proper interpretations with sustainability.

This research would focus on education and awareness of visual impairment students.

Interpretation for Visual Impairment

this research focused on the fundamental objectives of interpretation concerning education and comprehension with amusement, parallel to Tilden's (1977) concept concerning interpretation for children program, whereby education with amusement is the key element to improve children's learning. Moreover, the blind require specific interpretation to improve their learning capacity, consistent with UNESCO (2020) recommendations. A museum is consequently a learning resource for the blind to improve not only their quality of life but also a life-long learning with educational activities. Therefore, interpretations for them would focus on sensory skills with haptic and auditory skills as the fundamental learning through their body, and the most significant learning for visual impairment is touch (Saleem & Al-Salahat, 2016).

Mostly well-known museums have designed tactile interpretations to create sensitivity to textures and shapes through touch like braille alphabet, replicas, models or activities. Philadephia Museum of Art (PMA), a role model organization, was the first to consider the importance of the blind through renovation and design to provide special support. The universal standard concept has been adopted while auditory learning by a dog and technological instruments are provided within activity spaces and exhibitions to meet organizational goals, which is education with fun for all audiences. A basic learning tools provided for people who are visually impaired is braille, a tactile writing system allowing them to access information through touch and communicate effectively. Most activities aim to enhance tactile learning, providing hands-on experiences through tactile models for better comprehension subjects or information like geography, mathematics, science, and art. Masterpieces of paintings such as Still Life with Apples and a Glass of Wine (Paul Cézanne, 1877-1879), Portrait of Camille Roulin (Vincen Van Gogh, 1888-1889) or Saint Francis of Assisi Receiving the Stigmata (Jan Van Eyck, 1430-1432) were transformed into the tactile models, allowing the blind to experience, and enjoy the touch tour in art studios (Thoma, 2013). Similarly, the Metropolitan Museum of Art (2020) operated tactile activities by providing notable artistic works and a mixed learning activity. The activity let the blind touch artistic works and draw according to art concepts given by curators. The outcome of this activity did not focus only on aesthetics, but also activated sensory skills and concentration. This practice is consistent with Museo Nacional del Prado, Spain which researched a new technique of tactile learning, Didú, 3-D printing by adding volume and texture to enhance the tactile imagination with greater emotional response (Matisons, 2015).

Another interpretative learning skill is audio, which is the ability to identify and locate sound through audio materials, such as recorded information, podcasts, audio guide and audiobooks. Listening to audio content can provide those with visual impairment with information to help them grasp complex concepts. Provision of audio guides on displaying collections, history, and details forms a basic standard service of museums provided for visitors to enhance their individual experience. However, a specialized museum, Cité de la Musique-Phiharmonie de Paris, added interpreted musical instruments and natural sounds to support the audio guide and enhance vividly learning (Jules, 2012). However, radio sound with technology as an option to enhance the blind's learning has also

researched and utilized RFID (radio frequency identification) to provide information and allow the blind or visually impaired people to go through their own paths without constraints as the RFID tags would identify all tangible interpretations in Euro Flora Exhibition (Bellotti et al., 2006).

Moreover, other sensory skills like smelling or orientation and mobility were used as alternative interpretation in museums (Boonlikitsirit, (2015).

MATERIALS AND METHODOLOGY

This research aimed to survey and assessed interpretations in the Coin Museum. The purposive selected as the case study due to the unique museum completely fulfilled with universal design, and interpretations for visually impaired visitors: braille interpretation, permanent exhibitions, temporary exhibitions, multi medias, interactive medias, tactile objects, audio medias, activities, temperature, and miscellaneous interpretation. The Main research question focused on the quantity of interpretations and its efficiency to enhance visual impairment learning. Mixed methods, quantitative and qualitative, were employed for data collection and analysis. According to sensitive sampling groups, the blind, approval is needed. The researchers first contacted authorized persons of the Coin Museum to ask for their approval to conduct the research by taking the visually impaired to visit and organize activities in the museum. After the museum's approval, researchers contacted the Director of the Bangkok School for the Blind and the parents of students who fulfilled the criteria for data collection approval.

The research was approved by the Human Research Ethics Committee of Thammasat University and obtained certificate No. SSTU-EC 134/2566. The parents were contacted to provide information regarding project details, children's involvement and benefits, and to request their permission via official letters. After that, they were asked to sign the consent forms. Moreover, all adult respondents were requested to provide consent before participation.

The data was collected from two purposive sampling groups: visually impaired students who were able to help themselves, interested in museum learning and willing to participate in the research, and teachers who supervised these students. The number of targeted students in this research was 33 while the number of target teachers amounted to eight due to the 1:4 ratio of teachers per visually impaired students (the Office of the Teacher Civil Service and Educational Personnel Commission, 2020).

On their visit to the museum, the participants were guided by the museum's staff, and they were asked to fill in a questionnaire after the day of museum visit due to physical disadvantages. The questionnaire was divided into two sections: person and non-person interpretations. Questions on person interpretations focused on the efficiency of communicative, transmission, and interactive skills with visual impairment, and the body of knowledge, while the section on non-person interpretations enquired about the levels of comprehension, awareness and amusement.

In-depth interviews with the teachers were conducted on three main issues: attitude towards interpretations in the Coin Museum like the most attractive interpretation, appropriate and interesting contents, difficulties of interpretations and recommendations for improvement. As for the museum staff, the questions involved three main issues, including basic guidelines to conduct visual impairment, employment of verbal and non-verbal languages such as tone of voice and touch, and recommendations for interpretations. Then, a focus group consisting of visually impaired students was conducted to collect data concerning ideal expectations of museums and their limitations on the issue of learning

Data analysis was conducted using descriptive statistics for the quantitative data on interpretation assessment, while content analysis was employed for the qualitative data. Subsequently, the Triangular approach was employed to cross and validate the data obtained though questionnaires, in-depth interview and focus groups.

RESULTS

Interpretation for Visual Impairment

A survey of the interpretations in the Coin Museum has been displayed on three floors which is composed of twelve permanent and one temporary exhibition. The first floor provided narration on the beginning of currency, followed by primitive money with the evaluation of medium exchange in the prehistoric era, money in the reign of King Rama IV as the key reformer of Thai coins. These coin narrations were demonstrated in 4D animation surrounded by interactive cave walls, and the replica of medium exchange or coins to evoke audience participation.

The second floor started with coins of India as the center of the ancient kingdom in Asia, exerting influence to neighbor kingdoms in Myanmar, Laos, Vietnam, Cambodia, and Thailand. Dvaravati, Lop Buri and Srivijaya, the primitive cultures of ancient Thailand, has exhibited through the commercial routes in each age. The evolution of recent Kingdom from Sukhothai, Ayudhaya, Thonburi to early Rattanakosin is followed. This floor also featured contemporary issues, including coins in Rattanakosin, coins in daily life, international coins, fact about coins, creation of coins and currencies through time. It depicted coins through animated videos with interactive maps and real coins.

The third floor mostly displayed coins circulating in the economy system and coins produced for auspicious occasions during the King Rama IX's reign.

interpretations for visual impairment designed and found in the Coin Museum were as follows.

1. Personal interpretation. The Coin Museum provided at least one staff member for an hour and a half of learning experience. This information was displayed, and the visitors can consider choosing the most convenient schedule. There were two staff who assisted a group of visual impairment students, and each consisted of at least fifteen students. This can lead to the implication that there is an enough number of curators, capable of aiding with all visitors, including the visually impaired who require specific assistance in terms of the appropriate resource allocation.
2. Non-personal interpretation. There are three main categories of interpretation for the blind: tactile interpretation, interactive media, and auditory learning. The details of each category are given below.

A. Tactile interpretations are categorized into four types.

Braille block, a tool that enhances and navigates the visual impairment to conveniently individual mobility. Braille blocks were found in specific areas, especially at the main entrance and pavements to the second and third floor. There were two types of braille block; linear block to lead the direction of movement, and spotted block to urge the blind to be cautious and stop when changing direction. Braille blocks were made from convex dark grey plastic. There was damage visible on some of the braille blocks. Noticeably, objects and chairs were placed on braille blocks at the welcome hall connecting with the main entrance.

b. Braille alphabet was a tool established on every floor to enable the blind to individually access information through touch. Braille was written both in Thai and English language and normally implemented along with the normal interpretative signboards. On the first floor was where braille's were the most found, especially in the hall of the Coin Museum's history. Also, there is only one braille interpretation which is likely designed for the blind, a big book with twenty-two-page narrating King Rama IV's role as the key reformer of Thai coin. This can highlight the museum's mission as a social institution that recognizes the significance of the visually impaired. However, the second floor had two or three braille boards installed in only two rooms, which were the Beginning of Coin and the Rattanakosin Coins, while the third floor featured six braille boards only in the King Rama IX's salon. Lastly, most interpretations have been exhibited in a window display which refrains from any touch without braille signboards on the third floor. Notably, most braille signboards were still efficiently tactile and well-functioning, and blurred ones were seldom found.

c. Replicas were tactile models that could represent spatial information through shape and enhance understanding of basic concepts. Tactile objects in the Coin Museum were generally coins and valuable items from ancient times such as cowrie salt or metals. The interactive wall in the main entrance showed replicas of tactile coins in the four periods: Funan, Sukhothai, Rattanakosin, and the present time. Moreover, tactile medium exchange and coins were found more on the first floor compared to the second floor and the third floor where there were no tactile objects available Notably, tactile objects were still sharp, and had clear shapes and lines for haptic learning.

d. Tactile activities were activities that could enhance the blind's learning with joy. The Coin Museum arranged only one activity on the first floor, which was a manual coin stamping machine. This activity was designed for both the able-bodied and visually impaired audience to stamp a coin on a provided piece of paper. However, if a blind person wished to this activity, assistance would be provided.

B. Interactive media, four-dimensional technology (4D), not only enhanced interactive learning but also provided entertainment via multisensory stimulation with individually immersive experience. The Coin Museum has well realized amusement learning, 4D technology was installed in the first chapter history of coin on the first floor but it was found only one. Various senses were integrated and activated, from audio, touch to smell. There was a narration voice explaining the evolution of coins, accompanied by burning smell to portray the primitive era, and sometimes the ground was shaking as a recreation of unexpected natural disasters such as earthquake, fire or flood.

C. Auditory learning tools provided detailed descriptions of exhibitions with historical contexts and thematic explanations. Additionally, audio tool service could enhance understanding and engagement with displayed objects. The Coin Museum mainly provided three types of audio tools: audio guides, videos, and sound effects.

a. Audio guide was normally offered for all exhibitions on all three floors indicated with the audio guide sign. Currently, Thai language was the only language available, while foreign languages like English, Chinese, Japanese, Korean, German, and French would be provided in the future to respond foreigner tourists' demand.

b. Videos, couple videos for people with visual impairment are averagely found in all areas of museum. Videos were most common on the second floor with four concerning the evolution of coins and the beginning of the coin, while there was only one video on the first floor explaining the history of the Coin Museum. On the third-floor video, there were two videos concerning coin designers and numismatic interviews, and King Rama IX's royal duties. It appeared that most videos are likely to enhance normal audience than visual impairment as functions rely on visual perception.

c. Sounds effects were automatically played when audiences walked it the Rattanakosin Era and Coins in Thai Culture exhibitions on the second floor.

In conclusion, the quantity of staff members was sufficient to serve the demands of visually impaired visitors and parallel to non-personal interpretations which can mainly enhance haptic and auditory skills. Evocation of olfactive skills was minimal.

Assessment of Interpretation for Visual Impairment

A total of thirty-three voluntary visual impair students and eight teachers were involved in this research to assess the interpretations in the Coin Museum. After museum visit and activities, the questionnaire on interpretations was distributed and the results are shown in two tables: Table 1 - Assessment of personal interpretation and Table 2 - Non-personal interpretations

According to Table 1, the study found that personal interpretation in the Coin Museum had high efficiency in communicative, transmission, and interactive skills with qualified knowledge of coins in general with a score of 4.25. The attitude towards voice of friendly and polite tones had the highest score (4.71), while unique skills in dealing with individuals with visual impairment should be improved due to the lowest score (3.71).

Table 1 : Details of personal interpretation assessment

No	Details	Score	SD
Communicative skills			
1.	Ability to use appropriate language to students with visual impairment	4.42	0.49
2.	Ability to speak with loud and clear voice.	4.28	0.69
3.	Ability to speak with polite and friendly tone.	4.71	0.45
Transmission and interactive skills			
4.	Ability to capture the students' attention	4	0.00
5.	Ability to offer opportunities for questions	4.42	0.49
6.	Ability to explain and educate within appropriate time frame	4.14	0.63
7.	Ability to evoke curiosity from students.	4.14	0.34
8.	Ability to deal with students with visual impairment using special skills	3.71	0.45
9.	Ability to assist or facilitate students with visual impairment on certain occasions.	4.42	0.49
Body of knowledge			
10.	Having qualified knowledge.	4.28	0.45
Total average		4.25	

The results from the quantitative data revealed the staff's high proficiencies in communication, interaction, transmission, and knowledge. However, during an in-depth interview concerning guidelines on how to deal with visual impairment, a staff mentioned that *"I feel unconfident dealing with the blind as I am new, and I have never received training before."* Consequently, some of them were unable to deal with students with visual impairment. Furthermore, staff who had training mentioned the special skills and the training course saying that *"the training course for visitors with visual impairment provided basic information through role reversal activities, allowing participants to play the role of the blind"*. *Special skills like group command and body of knowledge of visual impairment such as behavior and movement were dismissed, especially when they visited in a group*," This information is not only consisting with the unique skill but a teacher in the focus group also mentioned that *"I saw that the museum staff would like to ask the students with visual impairment to stand up and walk to another room. But instead of saying "stand up and walk", a staff should say "hold your friend's elbow" to encourage them to walk together and help each other."*

These findings showed that all museum staff were required to have a basic training course and special skills to deal with and facilitate visual impairment.

According to Table 2, non-person interpretations can effectively enhance visually impaired students' learning in terms of friendliness, comprehension with enjoyment. Comfortable weather highly impacted learning and concentration in the highest score at 4.80. Likewise, learning in this museum could increase the intention of coin preservation as cultural heritage at 4.80. The Coin Museum also provided amusement, creativity, and attraction with tactile activity at 4.73. However, the respondent may feel unsatisfied with appropriate content due to the lowest score at 4.13.

Table 2 : Details of non-personal interpretation assessment

8	Ability to enhance comprehension through appropriate content	4.13	1.18
9	Ability to enhance deeper learning of the history and evolution of coins	4.66	0.61
10	Ability to enhance learning better than a classroom setting	4.73	0.60
Awareness			
11	Ability to promote awareness of currency significance	4.74	0.45
12	Ability to promote awareness with pride of Thai coins as a priceless asset	4.60	0.50
13	Ability to promote awareness of coin preservation as cultural heritage	4.80	0.41
14	Ability to promote awareness of self-benefits after learning	4.40	0.73
Enjoyment			
15	Interpretation's ability to represent amusement, creativity, and attraction	4.73	0.45
16	Interpretation's ability to draw attention from beginning to end.	4.66	0.48
17	Interpretation's ability to enhance enjoyment of tactile activity	4.73	0.45
18	Ability to enhance enjoyment of all interpretations anytime as abundant interpretations allow you to access	4.30	0.97
19	Interpretation's ability to enhance enjoyment from auditory medias	4.66	0.48
20	Interpretation's ability to enhance involvement	4.20	0.94
Total average		4.57	

The quantitative result displays showed that non-personal interpretations having friendliness and enhancing comprehension, awareness with enjoyment for visual impairment in high satisfied performance. However, teachers in depth-interview mentioned a concern about the quantity that *"I noticed that tactile activities were scarce compared to tactile objects. I saw only one in the museum, which was a manual stamp coin which seemed inconvenient for students with visual impairment, as assistance was required as always."* and *"all medias in the Coin Museum seemed sufficient for students with visual impairment but those interpretations were clustered on the first and second floor. I did not see much on the third floor."* Moreover, these clustered interpretations were improperly designed for visually impaired students as *"most collections were displayed on windows, and certainly, this would impact students' learning because tactile objects could draw attention and enhance their learning better than braille alphabets."* and *"most video medias or 3D medias rather focused on individual learning and visual learning because there was no audio command support or any assistive tool for the blind to access and interact with those medias. Thus, visually impaired students were unable to enjoy interesting content."*

No	**Detail**	**Score**	**SD**
Visual impairment friendliness			
1	Various medias and sensory interpretations can support learning story of currency.	4.60	0.73
2	Adaptive technology can enhance learning.	4.60	0.73
3	Advanced technology can further enhance learning.	4.60	0.73
4	User-friendly media can enhance learning.	4.46	0.83
5	Comfortable weather can enhance learning concentration.	4.80	0.41
Comprehension			
6	Ability to enhance comprehension using assistive technology and medias.	4.40	0.73
7	Ability to enhance comprehension using simple language.	4.60	0.61

The qualitative findings were parallel to the quantitative one in terms of enhancing involvement. Visually impaired students were unable to access individual learning and enjoy the interpretation. Moreover, appropriate content which had the lowest score may have resulted negative attitude towards interpretation as the barrier of learning and comprehension.

DISCUSSION

According to the first objective, which is to survey interpretations for individuals with visual impairment, it is found that the Coin Museum is qualified as a museum for visitors with visual impairment because unique interpretations for eyesight disadvantage learning are properly provided and managed. To enhance their learning capacity, sensory acquisition should be conducted through fundamental haptic and audio interpretations which allow them to individually experience (Kizilaslan, 2020). Tactile activities and objects with multi medias and auditory learning in the Coin Museum are implemented in the same manner as in well-known museums such as the Tactual Museum of the Lighthouse for the Blind of Greece (Greece), National Museum of Singapore (Singapore), Victoria and Albert Museum (United Kingdom) or Typhlological Museum (Spain). Those museums are superior to the Thai one in term of quantity and variety of interpretations including provision of guide dogs. However, the Coin Museum has at least carried out the concept and policy of access for all, which is the essence of museum ethics recommended by International Council of Museums (2017).

As for the second objective, which is to assess interpretations for individuals with visual impairment, it is found that quality of both personal and non-personal interpretations in the Coin Museum still requires improvement. Firstly, personal interpretation, special communicative skills, museum staff to deal with visitors with visual impairment with good training and regular review are significant factors for museums as learning center. Appropriate communication based on understanding of visually impaired visitors can yield more universal museum experience (Wakatsuki et al.,2020). Moreover, museum staff is the key element of museum to assist visitors with visual impairment in interpretating and providing easy access to collections and they are an effective way to promote unique service in museum. (Handa, et al., 2010).

Secondly, non-personal interpretations, such as videos, interactive medias, and individual activities in term of practical and functional approach is not likely to accord with universal design principle indicating the tool which can be usable for all people without physical ability limitations. This concept is composed of seven principles:1) equitable use 2) flexibility in use 3) simple and intuitive use 4) perceptible information 5) tolerance of error 6) low physical effort and 7) appropriate size and space for approach and use (Burgstahler, 2007). However, interpretative medias in the Coin Museum are lacking in the first two principles: equitable use and flexibility in use, as visitors with visual impairment were unable to access some videos or interactive medias that relied on visual rather than audio or optional modes to accommodate individual experience. Also, braille blocks were quite flat, and they were set in a limited space or only in the main corridor, causing difficulties for visually impaired visitors to individually access in all spaces of museum. Moreover, basic assistive technology has not been found as the possible interest to visit museum like 3D printing or tactile maps which can be applied for all visitors including visual disadvantage persons. This technique is not only simple and intuitive, but it also enhances visually impaired visitors' access to collections in the museum with enjoyment (Gual et al., 2011).

The interpretations in the Coin Museum have been claimed to have universal design for disabilities including visual impairment; however, the process of evaluation by those users was dismissed. Evaluation is a common process from start to finish with all participants involved in each stage. Currently, the Coin Museum is at the final stage, summative evaluation concerning the process to obtain results or feedback at the end of project whether the objectives have been fulfilled. This is an effective approach to compare findings from the museum to baseline data and measure concrete success. A simple way is to ask or have questionnaire towards museum in any aspect (The East of England Museum Hub, 2008). The Coin Museum can complete the evaluation stage by questioning individuals with visual impairment about the interpretations and infrastructure based on universal design concept. This data collection would serve as a source of data from which the Museum can draw on for improving the experience for visitors with disabilities.

CONCLUSION

It can be said that the study and assessment of interpretations for visual impairment in the Coin Museum reveals the points for improvement both qualitatively and quantitatively. This study also reflects the current situation of the policy about learning enhancement for individuals with visual impairment has been incomprehensively applied, and less impacted on the pragmatic level. Museums that offer learning enhancement tools for visitors with disabilities including visually impaired visitors in Bangkok are limited to the Coin Museum, the Touch Museum Honoring Her Majesty the Queen, the Siriraj Phimukhsthan Museum, and the Banglamphu Museum. It should be noted that only the Coin Museum meets the standard of universal design concept due to its modern structure while the others are conservation buildings with limitations regarding renovation. For instance, there is no ramp construction in those buildings for individuals with disabilities since it would damage the aesthetics and the original design (Dechaphiwat, 2022). The existence of four museums for individuals with visual impairment in Bangkok not only reflects the centralized management policy but also a gap between the capital and regional area. Bangkok has 5,063 registered visually impaired persons while the Northeastern provinces have 55,845. (Department of Empowerment of Persons with Disabilities, 2024). Bangkok has the least visually impaired persons but is filled with museums catered for specific needs. On the contrary, the Northeastern region which has the most visual disability persons lacks such facilities. This evidence highlights Thailand's imbalance in terms of learning opportunities and quality of life.

Consequently, museums are unable to fully perform their roles in equally enhancing learning for visitors with visual impairment unparallel public policy signifying disabled people based on inclusiveness and the best for effective performance. In practice, individuals with disabilities and visual impairment have negative experience towards individual travel due to the city's infrastructure in the city or the living space likely fail to accommodate them. Sidewalks or footpaths are not designed to accommodate them with no braille blocks or alphabets in public space or facilities. Public transportation for individual travel is impossible since bus stops do not provide assistive tools that notify bus arrival. This public policy is impractical and likely to discriminate against individuals with visual impairment and disabilities (Boonrungtaveesup & Vongsayan, 2018). This study is consistent with previous research (Komolkitti, 2008) which claims that the three main constraints of visual impairment are physical, systematic and attitude in social model and human rights concept. However, these constraints have never been seriously considered, and have mainly impacted on built environment policy with disregard to visual impairment. Crosswalks and ramps are minimized while overpasses are maximized due to complicated traffic with economic growth surrounded by skyscrapers in the city. Also, each public transportation is unconnected and persons with visual impairments cannot access them with convenience. This policy is not only impractical but also ineffective as those with visual impairment do not benefit from it at all.

Finally, from the data, policies to enhance the learning of individuals with visual impairment are incomprehensive, centralized and impractical. These policies have reinforced the idea of individuals with visual impairment as burdensome and pitiful, always requiring special physical and social supports and lacking the capacity to live as normal persons. Infrastructure and facilities have not been designed to accommodate everyone. A visually impaired person is treated with alienation and unwanted sympathy. Instead of sympathy, they would like to be treated as a normal person as to not experience even more alienation (Kamchoke, 2022). Importantly, there must be a paradigm shift from nurture to work for development of visual impairment and treat them as equal members of the society with the same rights to access working space, social activities, or museums in term of independent long live learning.

AUTHORS CONTRIBUTION

Dr. Ratchaneekorn Sae-Wang designed and conducted the research including data collection. Dr. Phitchakan Chuangchai analyzed data and mutually approved final version.

ACKNOWLEDGEMENT

This research is sponsored by Research Fund, College of Innovation (Fast Track CITU FT.002/2566) and it received great support from the energetic and kind CITU members. Moreover, I would like to thank Vichaya Boonyaratapunt for the inspiring ideas and advice at the initial stage of the research.

REFERENCES

Bellotti, F., Riccardo, B., Gloria, D. A., & Margarone, M. (2006(. *Guiding Visually Impaired People in the Exhibition*. https://www.researchgate.net/publication/228755834_Guiding_visually_impaired_people_in_the_exhibition

Boonlikitsirit, B.)2015). *Cultural Museum Patterns for Visual Impairment.* https://buuir.buu.ac.th/xmlui/handle/1234567890/3466

Boonrungtaveesup, K. & Vongsayan, H. (2018). Discrimination against disability in Bangkok public service. *Proceeding of National Conference in Humanities and Social Sciences 2018.* SuanSunandhaRajabhat University. http://hs.ssru.ac.th/useruploads/files/ 20181003/b2509 e4abaa 6361586bcd917dc79c6ef530745be.pdf

Burgstahler, S. (2007) *Universal design in education: Principles and applications.* https://www.researchgate.net/publication/230853086_Universal_design_in_education_Principles_and_applications

Chinthammamitr, P. (2019). *Stone, Soil, Bricks: Life Revival to Museum*. Bangkok : Banana Studio.

Constitution of the Kingdom of Thailand (B.E 2560). https://cdc.parliament.go.th/draftconstitution2/ewt_dl_link.php?nid=1460&filename=index

Dechaphiwat, N. (2022). *Museum Management for Visual Impairment.* https://museum. socanth. tu.ac.th/ wp-content/uploads/2022/07/museum_management.pdf

Department of Empowerment of Persons with Disabilities. (2024). *Statistics of Person with Disabilities in January*. https://ecard.dep.go.th/nep_all/file/Stat2567/Stat_Jan67.pdf

Department Secretary Office, (2015). Cooperation of *Ministry of Social Development, Human Security and Ministry of Culture to organize mobile exhibition for the blind .* http://web1.dep.go.th/?q=th/news/.

Gual, J., Puyuelo, M. & Lloveras, J. (2011). Universal design and visual impairment:

Handa, K., Dairoku, H., & Toriyama, Y. (2010). Investigation of priority needs in terms of museum service accessibility for visually impaired visitors. *British Journal of Visual Impairment*, *28*, 221- 234. https:// DOI: 10.1177/0264619610374680

International Council of Museum. (2017). *Code of Ethics for Museums*. https://icom.museum/wp-content/uploads/2018/07/ICOM-code-En-web.pdf

Jam, F. A., Akhtar, S., Haq, I. U., Ahmad-U-Rehman, M., & Hijazi, S. T. (2010). Impact of leader behavior on employee job stress: evidence from Pakistan. European Journal of Economics, Finance and Administrative Sciences, (21), 172-179.

Jam, F. A., Mehmood, S., & Ahmad, Z. (2013). Time series model to forecast area of mangoes from Pakistan: An application of univariate ARIMA model. Acad. Contemp. Res, 2, 10-15.

Jongkol, J (1989). *Museology*. Bangkok : Amarin Printing.

Jules, C. (2010). Sound within touch. *Open Edition Journal*, *130*, 5-11. https://doi.org/10.4000/ocim.125

Kamchoke, C. (2022, March 30). The inconvenient city makes people with disabilities feel alienated. *The Urbanis.* https://theurbanis.com/life/30/03/2022/6382

Kizilaslan, (2020). Teaching students with visual impairment. in Roberta V.Nata (Ed.), *Progress in Education*. New York : Nova Science Publishers, pp : 81-103.

Kluaymai, T. (2005). *Narration of King Rama V*. Bangkok : Thawiphat Press.

Komolkitti, P. (2008). Life and constraints in travel of Thai disabilities. *Academic Journal of Architecture*,*1*(5), 63-77.

Lertcharnrit, T. (2011). *Cultural Resource Management*. Bangkok : Princess Maha Chakri Sirindhorn Anthropology Centre (Public Organisation).

Lumidao, Y., Espique, F., & Canuto, P. P. (2024). Gender-responsive pedagogy of Kalanguya MTB-MLE teachers in promoting gender role awareness. Pakistan Journal of Life and Social Sciences, 22(2), 4110-4126.

Matisons, M. (2015). *3D Printing Technique Didú Helps Visually Impaired Feel Art.* http://3dprint.com/46099/didu-helps-sight-impaired-art/

McArthur, S. & Hall, C.M. (1996). *Heritage management in New Zealand and Australia : Visitor Management, Interpretation and Marketing*. Oxford : Oxford University Press.

Moore, M. (2015). A Word from the President. *Sala NMV Magazine.5,* 1-3.

National Education Act 2542 (B.E) https://dl.parliament.go.th/handle/20.500.13072/544761

National Science Museum, (2021). *Dialogue in the Dark from Germany*. https://www.nsm.or. th/nsm/en/node/5062

Office of the Teacher Civil Service and Educational Personnel Commission. (2020). *Teacher Staffing Rate Standard*. https://otepc.go.th/images/00_YEAR2563/06_PB/circular_ document/v23-63.pdf

Sakklavut. (2020). *About the Coin Museum*. http://coinmuseum.treasury.go.th /news_ view.php?nid=188.

Saleem, S.Yousif. & Al-salahat, M. (2016) . Evaluation of sensory skills among students with visual impairment. *World Journal of Education, 6*(3). https://DOI: 10.5430/wje.v6n 3p66

Samsung, (2014). *Samsung's "Insight Exhibition": The World Seen from the Heart.* https://news.samsung.com/global/samsungs-insight-exhibition-the-world-seen-from-the-heart.

Seccombe, P. & Lehnes, P.)2015). *Heritage Interpretation for Senior Audiences : A Handbook for Interpreters and Interpretation Managers*. https://www.interpret-europe.net/fileadmin/Documents/projects/HISA/HISA_handbook.pdf

Siriraj Museum, (2019). *Tactile Museum*. https://museum.li.mahidol.ac.th/th/museums/ ?p=888.

tactile product for heritage access. *Proceedings of the 18th International Conference on Engineering Design 5*, 155-164. https://www.designsociety.org/publication/30588/ UNIVERSAL+DESIGN+AND+VISUAL+IMPAIRMENT%3A+TACTILE+PRODUCTS+FOR+HERI TAGE+ACCESS

The East of England Museum Hub (2008). *Evaluation Toolkit for Museum Practitioners.* Norwich : Museum Libraries Archives.

The Metropolitan Museum of Art. (2020). *For Visitors Who Are Blind or Partially Sighted.* https://www.metmuseum.org/ events/programs/access/visitors-who-are-blind-or-partially-sighted

Thoma, S. (2013). An art history & art making course for blind adults at the Philadelphia Museum of Art. *Disability Studies Quarterly, 33,* (3). https://doi.org/10.18061/dsq. v33i3

Tilden, F. (1977). *Interpreting our Heritage*. North Carolina : University of North Carolina Press.

Timothy. D. J. & Boyd, S. W. (2003). *Heritage tourism.* Essex : Pearson Education.

UNESCO. (2020). *Ensuring the Right to Quality Education for Persons with Disabilities: from Commitment to Action.* https://unesdoc.unesco.org/ark:/48223/pf0000375212? posIn Set=1& queryId =N-EXPLORE-0d81c5bf-7436-40ac-afc4-5028f8b72f15.

Wakatsuki, D., Kobayashi, M., Miyagi.M., Namatame, M., Kitamura, M., & Kato, N. (2020) Survey for People with Visual Impairment or Hearing Loss on Using Museums in Japan. In K. Miesenberger, R. Manduchi, M.C.Rodriguez, & P. Peňáz (Eds.), *Computers Helping People with Special Needs: 17th International Conference, ICCHP 2020* (pp. 209–215). Springer. https://doi.org/10.1007/978-3-030-58805-2_25

Yudee, C. (1970). *The Person Works for Museum from 2428 to 2445 (B.E).* Bangkok: Religious Printing.